

The use formaldehyde as a biocide for private area and public health area disinfectans and other biocidal products (PT2) and its impact on human health

The use of formaldehyde as a biocide for veterinaay hygiene (PT3) and its impact on animal and human health

NON-CONFIDENTIAL

Synerlogic B.V.

10-04-2015

TABLE OF CONTENTS

1. THE COMPANY SYNERLOGIC B.V.....	3
2. INTRODUCTION	3
3. MICROBIOLOGICAL EFFICACY AND SUBSTANCE PROPERTIES OF FORMALDEHYDE.....	4
4. HEALTH RISKS	5
5. CONCLUSION	5

1. THE COMPANY SYNERLOGIC B.V.

Synerlogic is a production and trade company. The headquarter is located in Duiven. Synerlogic has developed, produced and distributed ingredients, (cattle) feed additives, chemicals and cleaning and disinfecting products for over 100 years. The products find their way to more than 40.000 customers across the globe, ranging from the dairy farmer to the food industry.

Synerlogic distributes formaldehyde as SYN-formaline 37% in The Netherlands. SYN-formaline 37% is here authorized under number 13525N.

2. INTRODUCTION

Infectious diseases of animals are caused by bacteria, viruses and fungi; some of the pathogens have an epidemic potential such as infectious hoof disorders in dairy cattle, Salmonella infection of poultry flocks, swine fever, foot-and-mouth disease of bovine and avian influenza (Kijlstra et al., 2006). The protection of animals from infectious diseases is an extremely important part of commercial farming in protecting animals, for food safety and toward the prevention of zoonotic infections transmitted to humans.

Example 1. Infectious hoof disorders such as papillomatous digital dermatitis (PDD), interdigital dermatitis/heel horn erosion (HHE) and interdigital pododermatitis. Digital dermatitis is a disease which is spread worldwide, and has been reported as endemic in western and southern Europe and the USA (Brizzi 1993, van Amstel et al., 1995, Clarkson et al., 1996, Rodriguez-Lainz et al., 1996, 1999, Read and Walker 1998, Wells et al., 1999, Murray et al., 2002, Somers et al., 2003). Digital dermatitis is a painful disease which easily spreads within a herd of cows and in infected dairy cows reduces the milk production and increases calving interval (www.nadis.org.uk).

Example 2. Salmonella is the leading cause of hospitalisations (28%) and deaths (35%) attributed to known bacterial pathogens transmitted by foods in the United States (Scallan et al, 2011). This pathogen is capable of surviving extended starvation and desiccation stresses and has caused major disease outbreaks associated with foods of low water activity (Podolak et al, 2010). In livestock housing Salmonella persist for long periods and may even multiply upon stock change if moisture is added or the houses are restocked (Gradel and Rattenborg 2003).

Example 3. Empty rooms, stables, green houses, industrial buildings etc.... used for different purposes can harbour a multitude of pathogens, on the surface of and in cracks and crevices in floors, walls and ceilings. Procedures, tools and chemicals need to fulfil specific requirements to achieve a proper disinfection but also need to be compatible with the areas which are disinfected and to pose no harm for man and other living species in the disinfected areas and the environment.

Example 4. Warm water baths for cleaning all kinds of especially organic material are an ideal breeding ground for Legionella bacteria. Aerosols can be formed during industrial processes in which these baths are used and subsequently pose a chance of infection following inhalation.

3. MICROBIOLOGICAL EFFICACY AND SUBSTANCE PROPERTIES OF FORMALDEHYDE

Formaldehyde, marketed as formalin, a solution in water, is effective against a broad range of bacteria, viruses and fungi and has been used for decades as disinfectant in the areas described in the examples above.

Digital dermatitis.

Lesions which are difficult to see represent an important reservoir of infection for the rest of the herd. Footbathing of the whole herd every 1-6 months can be very effective at treating a herd of cattle for digital dermatitis. Formaldehyde has shown to be an effective substance for this purpose (Holzhauer, Veterinary Record, 162, 41-46 2008). Formaldehyde as a formalin solution is stable during storage, not affected by contamination compared to peroxides, readily (bio-)degradable (no residue) and easy to handle. Furthermore resistance against formaldehyde is unlikely to develop.

Digital dermatitis probably affects over 40% of cows in infected herds making it one of the most common causes of lameness and foot disease in UK dairy cattle, costing the average farm roughly € 40 per cow per year (www.nadis.org.uk). Given the fact that the population of dairy cows in the EU is approximately 23 million (Eurostat), the economic damage caused by digital dermatitis is roughly € 920 x 10⁶ per year. A daily treatment by means of a 200 L foot bath with a diluted formalin solution costs about € 7.50 per cow per year (www.nadis.org.uk). However, since in practice a formalin foot bath is less frequent required (once per week or two weeks) the costs will even be lower.

Poultry houses

Broiler chicken are housed in large stables and raised in a period of 5 to 7 weeks before being slaughtered. The entire stable is cleaned and subsequently disinfected. The preferred substance is formaldehyde. One of the major benefits of formaldehyde additional to the ones listed previously is its gaseous nature, the substance evaporates and the entire room including cracks and crevices are disinfected. In addition, due to the use of formalin/formaldehyde less antibiotics need to be used and chance of development of resistance of microorganisms against these antibiotics is reduced. Formaldehyde is compatible with a large number of materials p.e. does not have corrosive properties when coming into contact with metals which are part of tools and equipment in the animal house.

The disinfection procedure starts with closing the ventilation openings of the stable and switching off the air-conditioning. Subsequently formalin is nebulized in the stable by means of a fogging apparatus equipped with a timer or remote control. After 24 hours the formaldehyde concentration is checked and when the concentration of the gas has decreased to safe levels, ventilation openings are opened and the air conditioning is switched on. No formaldehyde is vented of to the environment.

Approximately 4 million tonnes chicken meat was exported by EU nations in 2011 (<http://www.thepoultrysite.com/>). The bulk of Europe's trade is conducted between EU member countries as, of the near 3.4 million tonnes exported by EU nations in 2011, only 30 per cent was sold to countries outside the Community.

Empty rooms, stables, green houses, industrial buildings

Disinfection of closed rooms in buildings for a variety of purposes is attained in a similar way as in poultry houses. Here also the formaldehyde offers the benefits of low risk of development of resistance, penetration in cracks and crevices, disintegration within a relative short period of time, broad range of efficacy, easy to handle, stable during storage and no residues.

Warm water baths

Warm water baths which are used in industrial processes are ideal breeding places for Legionella bacteria. Formaldehyde is very effective against these bacteria which pose a health risk for workers when exposed to aerosols when this water is sprayed or nebulized.

4. HEALTH RISKS

Formaldehyde is, without doubt, a toxic substance. This is taken into account when a product is authorized for an application. However, the product is solely authorized for professional use and precautions and restrictions can be demanded which reduce the health risk for the worker to an acceptable minimum.

5. CONCLUSION

The combination of properties of formaldehyde/formalin solutions make it the preferred substance/product to be used as disinfectant in a broad area of applications. These properties are

- Broad working spectrum (bacteria, fungi, yeasts, viruses);
- Negligible chance of development of resistance;
- Excellent penetration in cracks and crevices;
- Easy degradable;
- Easy to handle;
- Compatible with nearly all materials, such as metals, plastics, wood and stone;
- Stable during storage.

Formaldehyde is a toxic substance, but when taken sufficient precautions, can be used without risk for the health. man animal and the environment.

This combination of properties is not met with the currently known substances which are proposed as alternative to formaldehyde.

Safety, Health and environmental responsibility are important subjects with in the company. Synerlogic B.V. is continuous improving the safe use of Formaldehyde (SYN-formaline 37%) in the industry together with our stakeholders.

Your sincerely,



On behalf of:

Mr. H. B. C. Kwakman
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